ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE PROPOSED TIN MINING OPERATION AT MUKIM PENGKALAN HULU (ML 087), DISTRICT OF HULU PERAK, PERAK

Project Proponent:

RBA ENGINEERING (M) SDN. BHD.

Environmental Consultant:

INTEGRATED ENVIROTECH SDN. BHD.

Legislative Requirement

Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 2015

Second Schedule:

- Prescribed Activity 8 (a): Mining of minerals in new areas involving large scale operation;
- Prescribed Activity 8(b): Mining of minerals within or adjacent or near to environmentally sensitive area; and
- Prescribed Activity 5(b)(1): Forestry – Logging or conversion of forest to other land use within a catchment area of reservoirs used for municipal water supply, irrigation or hydro-power.

Statement of Need

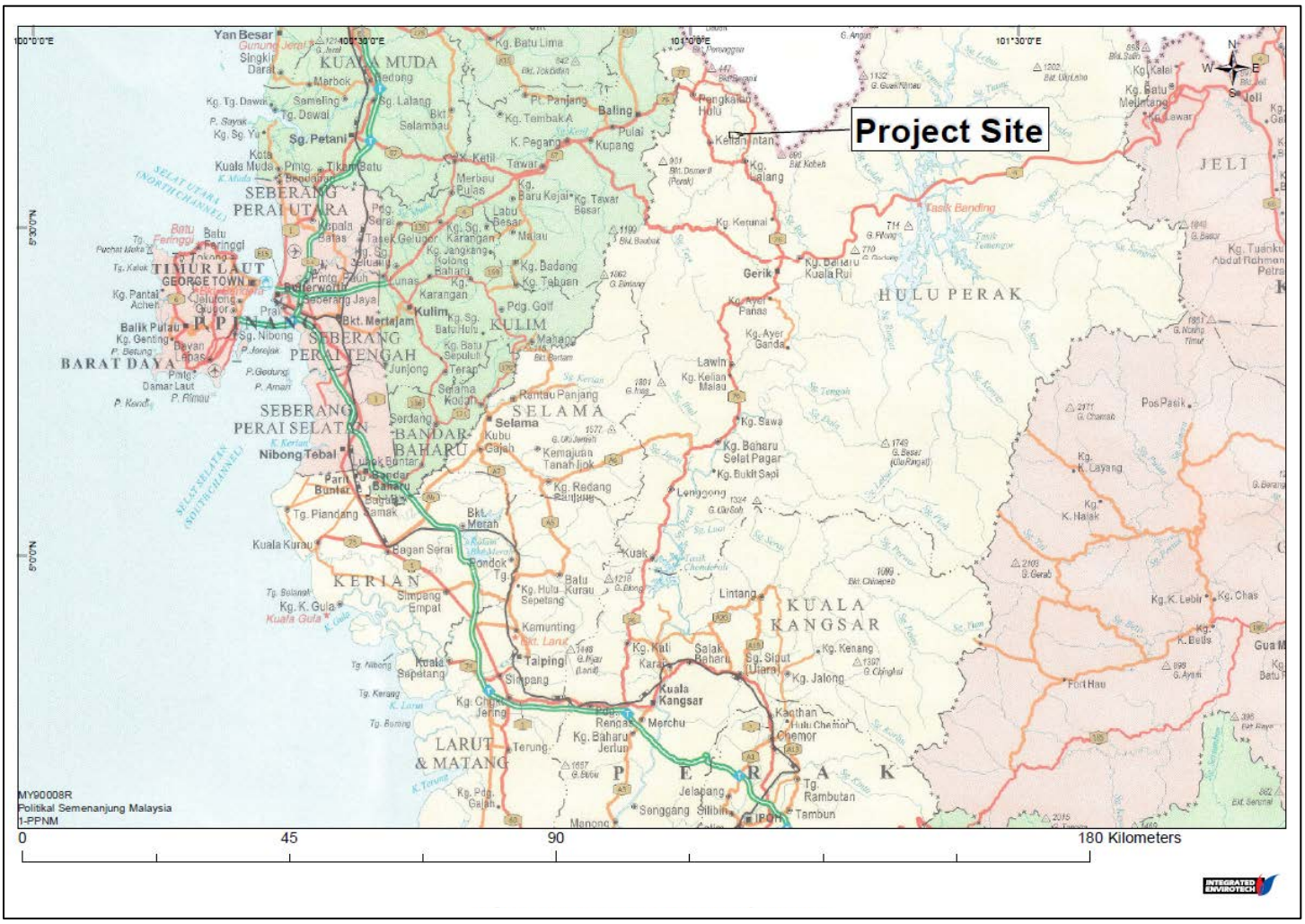
- Tin mining industry in Malaysia plays an important role in supplying basic raw materials to the construction and manufacturing sectors and contributes to the economic development.
- The discovery of tin deposits in Perak and Selangor and the high demand of tin due to the development of tin canning led to the rapid growth of Malaysia's tin industry in the 19th century.

Project Overview

- RBA Engineering (M) Sdn. Bhd. (RBAE) intends to undertake the management and the operation of tin mining on the state land at Mukim Pengkalan Hulu, District of Hulu Perak, Perak.
- The coverage area of the proposed Project site is approximately 202.3 ha (500 ac).
- The proposed method to extract tin is '*open cast mining*' method.
- Mining scheme consists of **two (2)** phases as follows:
  - Phase 1 covers an area of 18 ha – mining the colluvial tin reserve (loose materials)
  - Phase 2 covers an area of 36.8 ha – mining tin in hard rock materials.

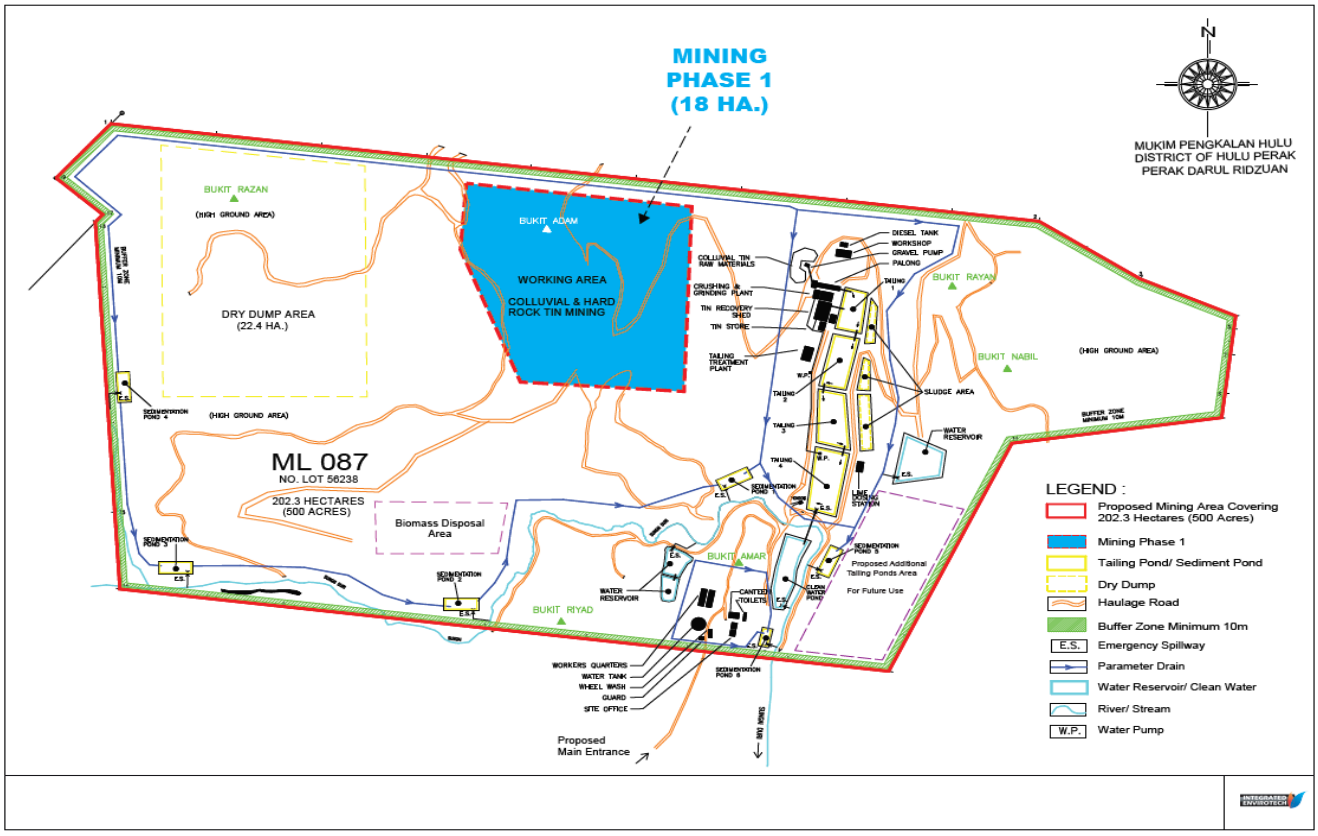
Project Location

Figure ES-1: Location of the Project Site



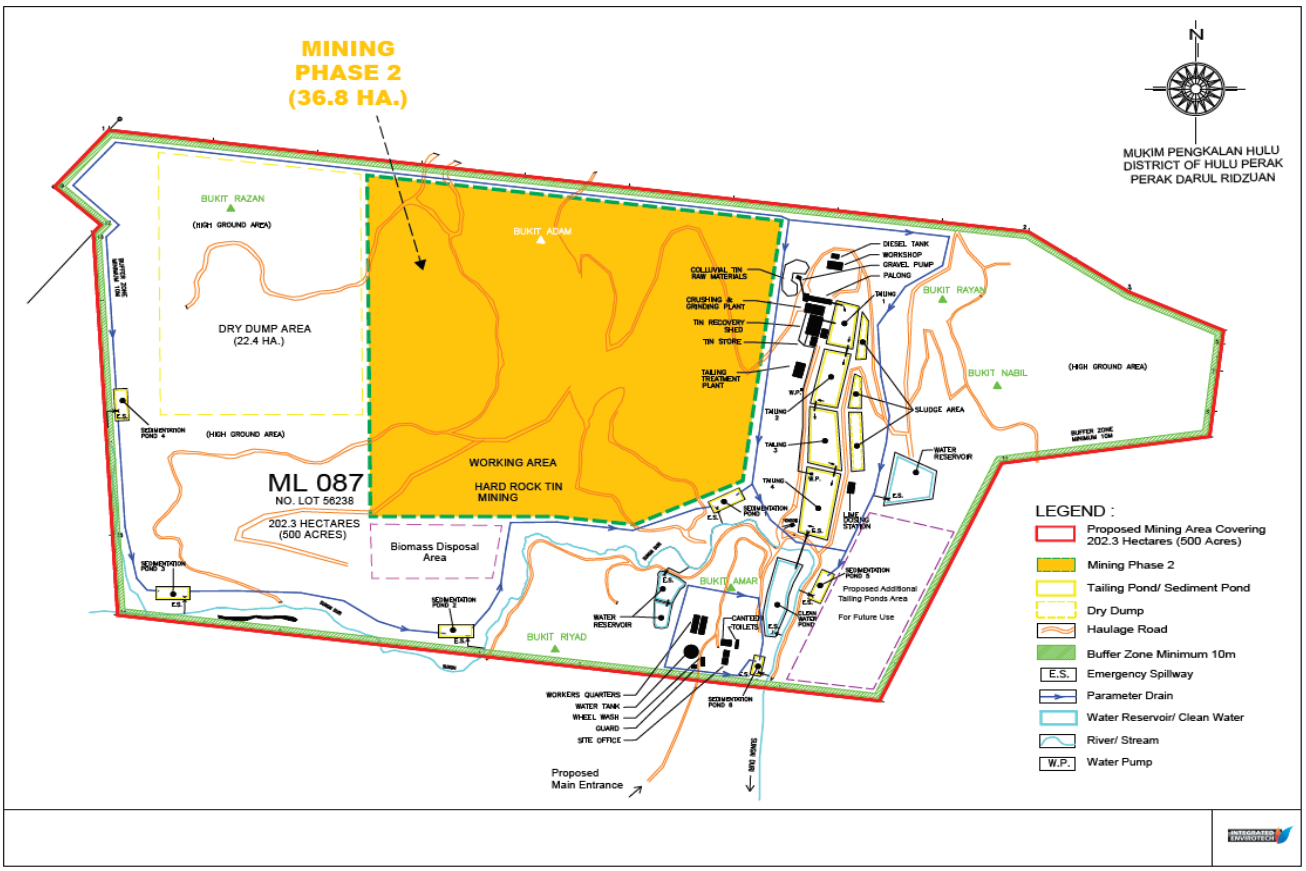
Mining Scheme – Phase 1

Figure ES-2: Tin Mining Operation in Phase 1



Mining Scheme – Phase 2

Figure ES-3: Tin Mining Operation in Phase 2



Project Components

PROJECT FACILITIES

- Tailing Ponds
- Dry Dump Area

POLLUTION CONTROL FACILITIES

- Wheel Wash Bay
- Sediment Basin

EQUIPMENT & MACHINERIES

- Excavation and Loading Equipment
  - Lorry
  - Hydraulic Excavator
  - Dozer
  - Wheel Loader
  - Back-pusher
  - Backhoe
  - Water Pumps
  - Gravel Pumps
  - Water Truck
  - Diesel Tanker
  - Roller
- Haulage Equipment
  - 6-Wheeler Tipper Lorry

INFRASTRUCTURE

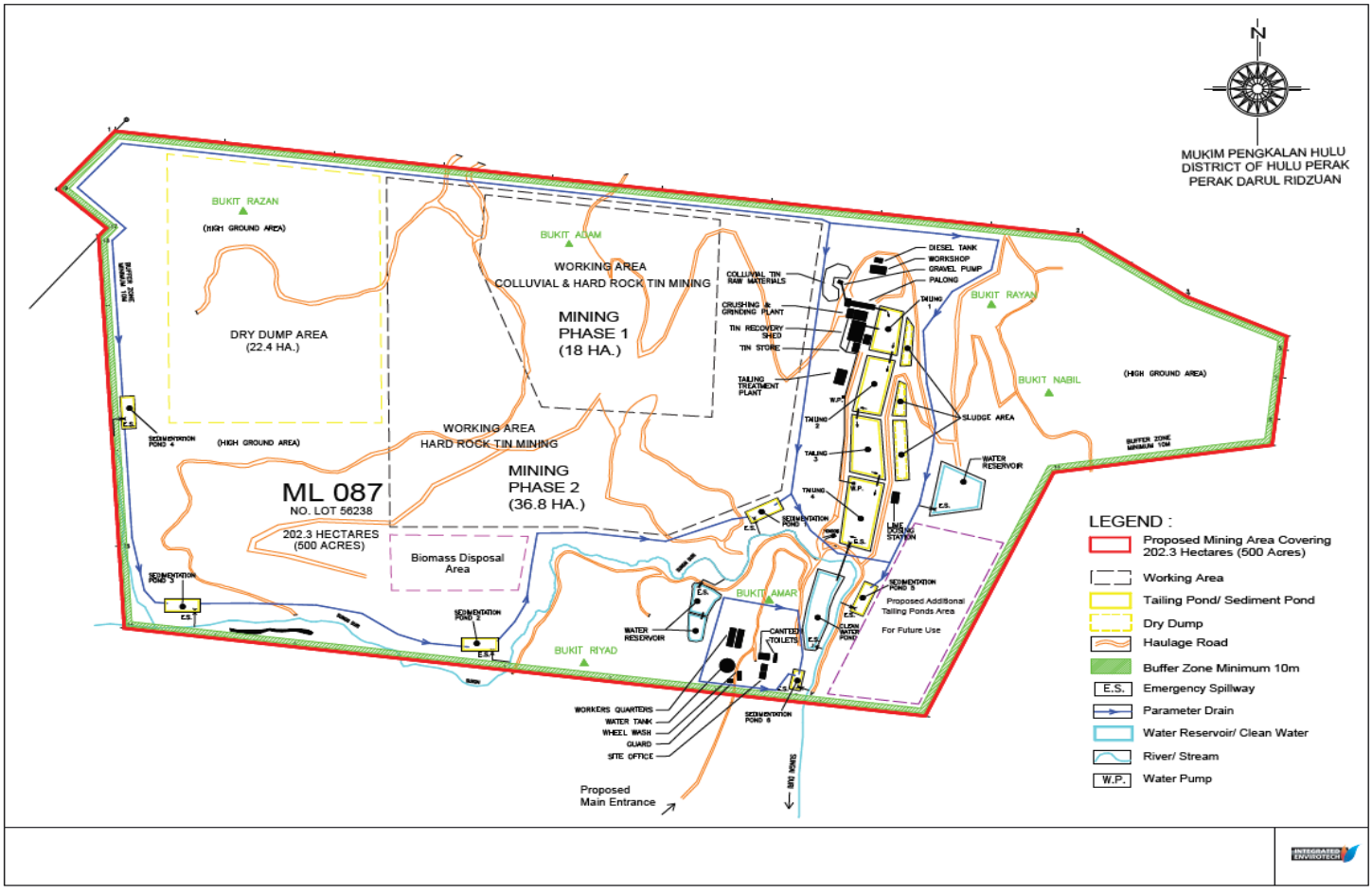
- Access Road
- Internal Haulage Road
- Drainage System
- Water Reservoir
- Building & Social Amenities

UTILITIES

- Power Supply
- Water Supply
- Telecommunication
- Fuel Oil Storage
- Waste Disposal System
- Sewage Disposal

Project Layout Plan

Figure ES-4: Mining Scheme Plan



Flow Chart of Tin Ore Recovery for Colluvial

Figure ES-5: Flow Chart of Tin Ore Recovery for Colluvial

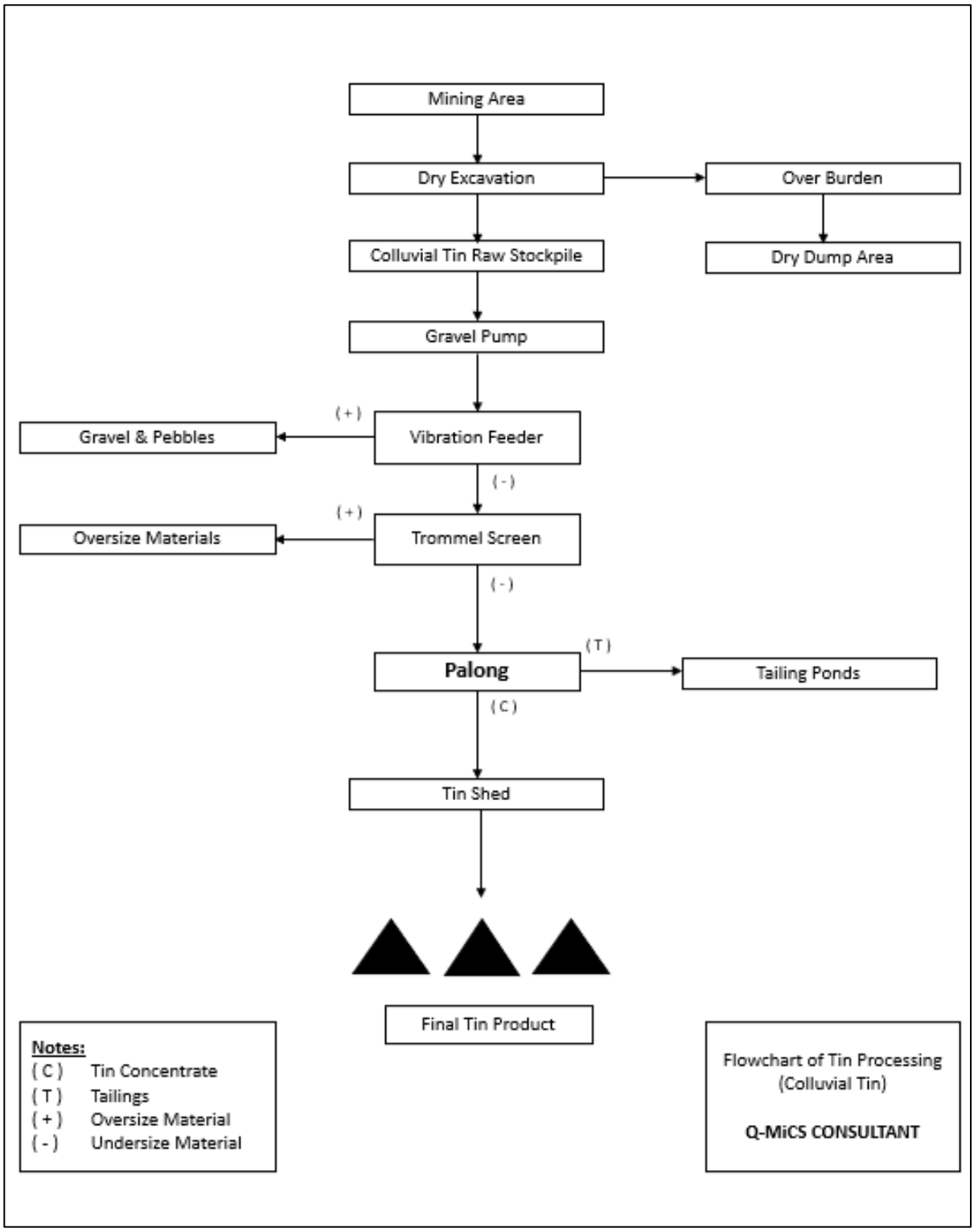
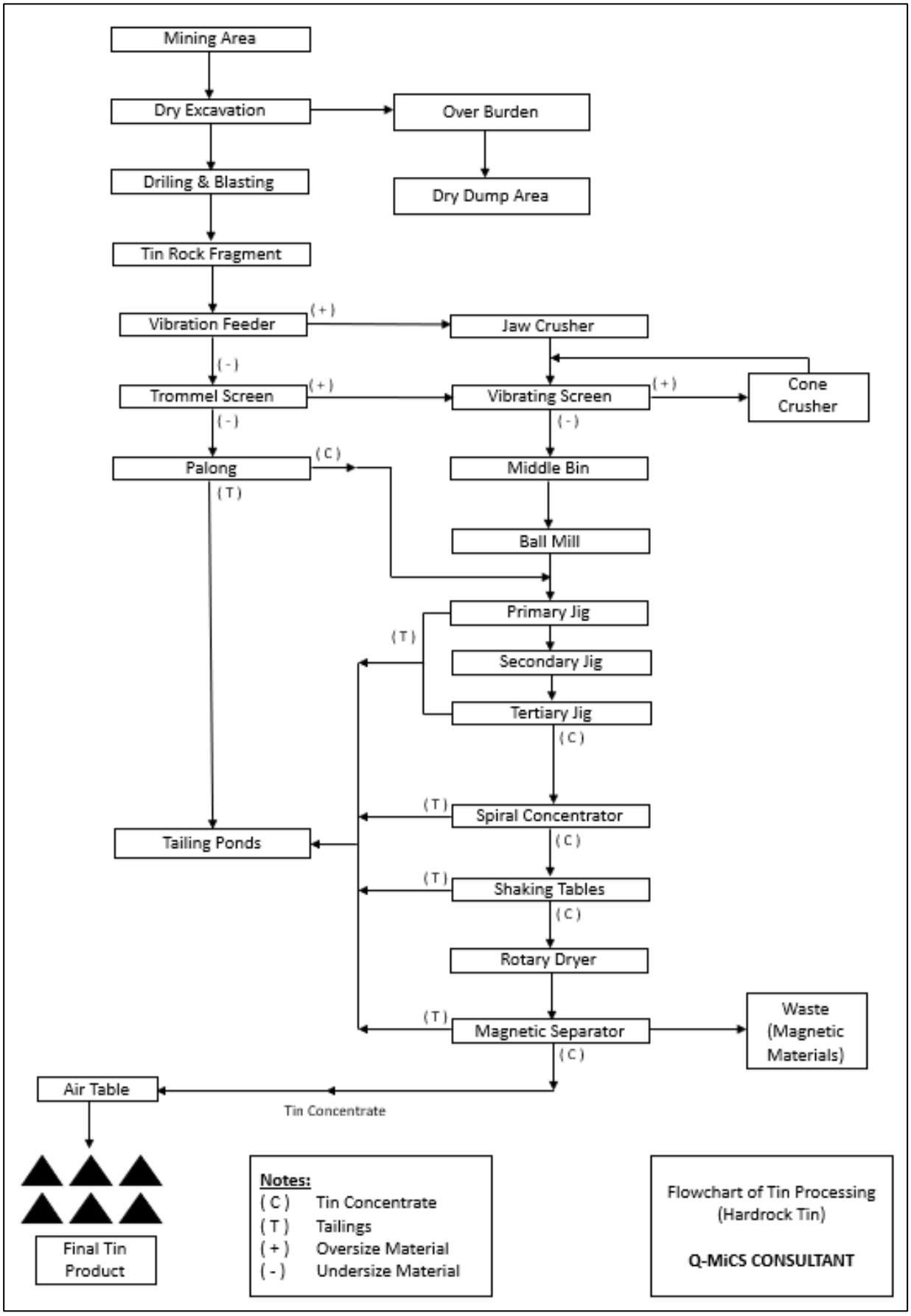


Figure ES-6: Flow Chart of Tin Ore Recovery for Hard-Rock



Project Activities

Exploration & Prospecting

- Exploration and Prospecting
- Preparation of Environmental Impact Assessment (EIA) Report

Development & Construction

- General Mobilization
- Mobilization of equipment and supplies
- Boundary demarcation and positioning
- Site clearing
- Upgrading and construction of internal road
- Access road
- Improvement of watercourses
- Installation of processing plant and other facilities

Production & Operational

- Deposit excavation operation
- Tin processing operation
- Final product
- Transportation
- Upgrading and maintenance of access road
- Domestics wastes
- Dry dumping area
- Tailing ponds area
- Tailing ponds de-silting operation
- Closed-circuit water re-circulation system
- Lime treatment into tailing ponds
- Continuous prospecting operation

Rehabilitation & Abandonment

- Re-vegetation of bare areas and restoration of all-natural drainage system and water course
- Clearance of any concrete structures whether on surface or sub-surface
- Re-profiling any created rock slopes to create long term stability.

Existing Environment

Physical Environment

Topography

- The Project site is located at Mukim Pengkalan Hulu in Hulu Perak District, Perak Darul Ridzuan.
- The nearest town is Pekan Pengkalan Hulu which is approximately 10 km to the southeast of the Project site.
- The proposed Project site is dominated by hilly areas that undulated between 180 m and 360 m above means sea level.

Climate & Meteorology

- The nearest meteorological station to the Project site is the Hospital Lenggong (60 km south from Project site) and Lubuk Merbau (76 km south from Project site).
- Meteorology data for year 2021 to 2022:
  - The average minimum and maximum monthly temperature ranged from 25°C to 27°C.
  - The monthly rainfall recorded ranged between 15.3 mm to 470.9 mm.
  - The monthly evaporation rate recorded ranged from 2.7 mm to 5.6 mm.
  - The annual wind rose pattern indicated prevalent wind coming from north and northeast directions, with mean wind speed recorded at 1.2 m/s.

Ambient Air Quality

- The baseline data was gathered at the Project site and the nearest sensitive receptors (6 sampling stations – known as A1 to A6).
- Parameters measured – Particulate Matter (PM10), Particulate Matter (PM2.5), Sulphur Dioxide (SO2), Nitrogen Dioxide (NO2) and Carbon Monoxide (CO).
- All parameters measured within the stipulated limit under the First Schedule of Guidelines for Environmental Noise Limits and Control, Third Edition, 2019

Geology

- The proposed Project area is located within 2 km to the east of the well-known Rahman Hydraullic Tin Sdn. Bhd. in Klian Intan area.
- The proposed Project site is underlain by sedimentary rocks, predominantly slate, shale, limestone and carbonaceous shale
- The soil profile of the proposed Project site was collected from 5 boreholes (GW1 – GW5).
- Total heavy metals in five (5) soil and rock samples were determined using acid digestion technique and analysed the solution using ICPMS.
- Eleven (11) elements are presented (Pb, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se and Cd)
- As, Cd, Pb and Zn had exceeded the limit of SSls. Other heavy metals were below limit.
- The results were compared against with the Contaminated Land Management and Control Guidelines No. 1: Malaysian Recommended Site Screening Levels for Contaminated Land (DOE).

Noise Level

- The baseline data was gathered at the Project site and the nearest sensitive receptors (6 sampling stations – known as N1 to N6).
- Parameters measured - LAeq, Lamax, Lamin, LA10 and LA90.
- All parameters measured within the stipulated limit under the First Schedule of Guidelines for Environmental Noise Limits and Control, Third Edition, 2019

Hydrology

- Sungai Duri and its tributaries are flow within the Project Site.
- The surface water flows southward into Sungai Duri and to the south-eastward into Sungai Kuak (1 km in distance).
- The water then flows into Sungai Rui (1.5 km in distance) which is one of the tributaries of Sungai Perak, downstream of Temenggor Dam.

Hydrogeology

- The baseline data was collected from 5 boreholes (GW1 – GW5).
- The water table of 5 newly developed groundwater wells ranged between 0.0 m (surface) – 9.3 m. The average water table is 2.53 m (or 223 msl)
- The local groundwater flow will generally move from high gradient i.e from the topography high areas to the lowest point (rivers and valley).
- The groundwater samples were analysed for 41 parameters as listed under Groundwater Quality Standard and Index (DOE).
- The results are compared against the Groundwater Quality Standards and Index (DOE) and Recommended Raw Water Quality Criteria (MOH).

River Water Quality

- The river water quality was carried out twice at 19 stations (WQ1 – WQ19).
- 43 parameters were measured as listed under National Water Quality Standard.
- All parameters measured were within the stipulated limit under Class III of National Water Quality Standards (NWQS) except for turbidity, TSS, BOD, iron, manganese and nickel which had exceeded the limit at all stations monitored.

Ecology

- 6 flora plots were established within the Project area (FF1 – FF6) to study flora. 43 species of flora were identified and only 2 species were identified as near threatened (NT).
  - Longan (Dimocarpus Longan) and Henry Wilson (*Sinowilsonia henryi*)
- 5 camera traps were installed within the Project area (CT1 – CT5) to study terrestrial fauna. A total of 50 species of birds, 20 species of herpetofauna were recorded. Only 6 species were identified as near threatened (NT).
  - Mammals – Asian Golden Cat (*Catopuma temminckii*)
  - Birds – Bushy-crested Hornbill (*Anorrhinus galeritus*), Lesser Green Leafbird (*Chloropsis cyanopogon*), Red-throated Sunbird (*Anthreptes rhodolaemus*), Rufous-crown Babbler (*Malacopteron magnum*), Short-tailed Babbler (*Pallorneum malaccense*) and Streaked Bulbul (*Ixos malaccensis*).
- Fish – the sampling was conducted at Sungai Rui, Gerik, Perak at 5 locations (NET1 – NET5). No fish was caught during the survey.

Human Environment

Landuse

- The existing land use within 500 m radius from the Project site is mainly secondary forest. The sensitive land use found within 5 km radius from the Project site.
- The existing landuse/ land cover within 5 km radius – agriculture, human settlement, mining area, river.

Population

- The population of Hulu Perak District (Year 2021) - 95,300 people
- Population of citizens by ethnics of Hulu Perak District
  - Malay (86.8%)
  - Chinese (6.9%)
  - Indian (10.8%)
  - Others (less than 6%)

Socio-economy

- No. of respondents : 385 respondents
- Interviewed at 3 settlements within ZOI I and 11 settlements within ZOI II

➢ 89.2% (ZOI I) and 92.9% (ZOI II) of respondents did not knowing about this proposed development

➢ 49.2% (ZOI I) and 59.1% (ZOI II) of respondents agree conditionally if the developer's project prioritizes local people in terms of human resources.

➢ 23.8% (ZOI I) and 24.7% (ZOI II) of respondents believe it will benefit the state's economy, particularly Perak.

Health Impact Assessment

- 385 household were surveyed, comprising 734 household members
- 15,258 cases of dengue per 100,000 population
- Other diseases, such as hypertension and cardiovascular diseases, had less than 10 cases.

Land Traffic

- Project site can be reached from Bandar Grik via Jalan Baling – Kuala Kangsar (FR76) which joins Jalan Lepang Nering (FR1157)
- Peak Traffic Flows:
  - Average Heavy Vehicle Composition = 0.0%
  - Peak Hour Periods
    - Morning Peak: 0800 to 0900 hours
    - Evening Peak: 1700 to 1800 hours
- The main mode of transport at the road surveyed is private cars.

Soil Erosion & Sedimentation

Development & Construction Phase	Env. Risk	Mitigation Measures
• Removal of vegetation • Construction of infrastructure	High	• Temporary drainage system for runoff control • Vegetation buffer as erosion control • Temporary metal hoarding
Production & Operation Phase		
• Excavation of Ore		

Air Quality

Development & Construction Phase	Env. Risk	Mitigation Measures
• Fugitive dust from the bare land after the land clearing activities • Fugitive dust from movement of heavy vehicles and equipment • Exhaust emissions	Low	• Open burning is strictly prohibited at the proposed Project site • Periodically maintenance on engines of machinery equipment and vehicles • Vehicle on-site speed restrictions shall be imposed to reduce dust generation and dispersion

Production & Operation Phase	Env. Risk	Mitigation Measures
• Crushing and screening activities • Heavy truck movement on gravel roads within site • Stockpile/dry dump wind erosion	Low	• Conveyor and hopper shall be covered • Crushing facilities with water sprinkler shall be installed • Enclosed screen and transfer points with water sprinkler shall be installed • Access road and internal roads within the proposed Project site shall be regularly sprayed with water particularly during dry and windy weather conditions • Speed limits shall be imposed on all vehicles entering and leaving the Project site to prevent dust turbulence.

Noise Level

Development & Construction Phase	Env. Risk	Mitigation Measures
• Operation of construction equipment and transportation • Movement of vehicle	Low	• Restricting working hours of noisy equipment to 0800 – 1830 hours to reduce the noise impact to the surrounding residents • Proper maintenance of the machineries and heavy vehicles to prevent higher noise level generated than manufacturer's specification

Production & Operation Phase	Env. Risk	Mitigation Measures
• Mining operation – tin extraction, transportation and crushing activities • Blasting	Low	• Working hour shall be limited to daytime only • Speed limit for heavy vehicles shall be imposed on site • Blasting hours shall be limited to daytime during weekday only • Blasting to be carried out by qualified personnel only

Vibration

Production & Operational Phase	Env. Risk	Mitigation Measures
• Blasting activities	Low	• The measurement point shall be at least the longest dimension of the structure from the sensitive receptors, if possible • The blast-induced ground vibrations can be significantly controlled by varying the location and orientation on point of interest from blast site.

Geology

Development & Construction Phase	Env. Risk	Mitigation Measures
• Land disturbance • Construction of infrastructure	Low	• Good drilling and excavating procedures shall be utilized to minimize the impact to the environment • Cutting of trees and new slopes shall be minimized • Only areas required for the creation of access road shall be cut and cleared • Make use of an existing road as much as possible and upgrading the existing road to improve its condition during pre-construction activities

Production & Operational Phase	Env. Risk	Mitigation Measures
• Alteration of landforms • Construction of Mining Pit • Geological Hazards	Low	• Implementing reclamation plans to restore mined areas to a functional ecosystem • Overburden shall be stabilized through the use of geotextiles, soil stabilization techniques, and vegetation cover. • Regular inspection of the slope can identify potential hazards and areas of instability.

Acid Mine Drainage (AMD)

Development & Construction Phase	Env. Risk	Mitigation Measures
• Acid mine drainage (AMD) arises from mining, where sulphate-rich ores are present and become detrimental to aquatic ecosystems.	Low	• Foreign workers shall be screened & undergo health check for infectious diseases. • Ground rules shall be enforced within workers residential areas to prevent social illness.

Hydrogeology

Development & Construction Phase	Env. Risk	Mitigation Measures
• Land clearing • Construction works	Low	• Install Perimeter Control Measures prior to commencement of excavation and earthworks. • Implement buffer zones.

Production & Operational Phase	Env. Risk	Mitigation Measures
• Mining activities can alter groundwater flow patterns and lead to changes in aquifer recharge and discharge areas	Low	• Install Perimeter Control Measures prior to commencement of excavation and earthworks. • Implement buffer zones.

Hydrology

Production & Operational Phase	Env. Risk	Mitigation Measures
• Mining operation • Change in runoff within the catchment	Medium	• 4 water reservoirs are proposed as permanent detention ponds with total area of approximately 1.5ha • 6 sediment basins are proposed as temporary retention ponds • Site clearing shall be carried out in 2 phases to reduce the simultaneous effect of increased surface runoff.

Water Quality

Development & Construction Phase	Env. Risk	Mitigation Measures
• Mining operation affect the groundwater quality.	Medium	• Implementation of LDP2M2 shall be executed stringently • Redirect storm water around processing site using drains, collection and diversion ditches.

Waste Management

Production & Construction Phase	Env. Risk	Mitigation Measures
• Solid waste ➢ Biomass waste ➢ Excavated waste/ Overburden/ By-product materials ➢ Construction waste ➢ Domestic waste • Scheduled waste	Low	• Biomass ➢ Open burning is strictly prohibited. • Excavated materials ➢ The excavated materials shall be disposed at dry dump area. • Construction waste ➢ All construction wastes and debris shall be collected and transported by the licensed contractor for final disposal site. • Domestic waste ➢ Waste segregation system for domestic waste generated on-site shall be implemented. Ensure that al waste is properly separated. • Scheduled Waste ➢ Scheduled wastes shall be managed according to the Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia published by DOE.

Ecology

Production & Operation Phase	Env. Risk	Mitigation Measures
• Terrestrial flora – biomass burning and posing risk of uncontrol forest fires. • Terrestrial fauna – Removal of soil cover that would affect the wildlife natural habitat. • Fish – soil erosion that cause an increase in suspended solids in water bodies is expected to affect he fish.	Medium	• The riparian zone shall be clearly demarcated. • No biomass will be removed from the proposed Project site. • Establish buffer zone to preserve wildlife habitat during the site clearing and site preparation activities • Any release of surface runoff from the proposed Project site during earthworks and operation shall not exceed the limits stated.

Socio-Economy

Development & Construction Phase	Env. Risk	Mitigation Measures
• The increase of heavy vehicles on the public road may risk other road users	Low	• Conduct at least one focus group discussion (FGD) with most relevant locals involving mukim Kerunai and Pengkalan Hulu. • The movement of heavy vehicles to comply with the Traffic Management Plan (TMP) in accordance with JKR requirements.

Production & Operational Phase	Env. Risk	Mitigation Measures
• The development may contribute to the air pollution, impact the water bodies, plantation	Low	• Make an arrangement for site visit involving the local representative and relevant authority officers • Mines operators need to provide a dedicated quarters/ rental house for foreign workers..

Health Impact Assessment

Development & Construction Phase	Env. Risk	Mitigation Measures
• The potential route of human exposure to the water pollutants.	Medium	• The workers safety, security and health are governed by the Occupational Safety and Health Act, 1994 (OSHA 1994), Factories and Machinery Act, 1967 (FMA 1967), Employee Social Security Acts, 1969 and Workmen's Compensation Act, 1952 • Periodic medical examinations among workers

Production & Operational Phase	Env. Risk	Mitigation Measures
• Water pollutants that may lead to non-carcinogenic effects on human beings.	Medium	• Practice good sanitation including hygienic toilets, clean water supplies and proper solid waste and scheduled waste disposal to avoid food and waterborne diseases • Open burning are strictly prohibited to avoid respiratory effects.

Traffic

Production & Operational Phase	Env. Risk	Mitigation Measures
• Transportation of the product	Low	• All vehicles that are allowed to transport the product from proposed Project site shall abide to the local authority requirements • Any damage to the road such as potholes shall be repaired immediately to maintain the performance of the road. • Lamp post shall be installed along the road leading to the proposed Project site to mitigate vehicle collision and safeguard road users during the night..

Safety Risk

Development & Construction Phase	Env. Risk	Mitigation Measures
• Accidental explosives and all their accessories	Low	• Only persons with satisfactory knowledge and training shall be qualified to handle explosives and blasting accessories. • Sufficient fire extinguishers shall be provided at the working areas.

Project Abandonment

Project Abandonment	Mitigation Measures
• Abandoned stockpile of pipes and structure will reduce the aesthetic characteristics of the surrounding areas & can be a habitat for pests and vectors. • Structures that are not maintained or removed will decay and poses safety hazard for public.	• Re-vegetation of bare areas and restoration of all-natural drainage system and water course • Clearance of any concrete structure whether on surface or sub-surface. • Re-profiling any created rock slopes to create long term stability.

Proposed Performance Monitoring

BMP	Parameter	Recommended Limit	Monitoring Location	Frequency
Silt	Silt marker	Not available	Refer LD- P2M2 Drawing (refer **Figure ES-7**)	• Weekly or • after rain event
Sediment Pond	Silt marker			• Quarterly
Earth drains with check dam	Sediment level			
Earth bund	Performance			
Silt Fence	Performance			
Roadside drain	Performance			
Overburden stockpile	Performance	20 m away from any watercourse		

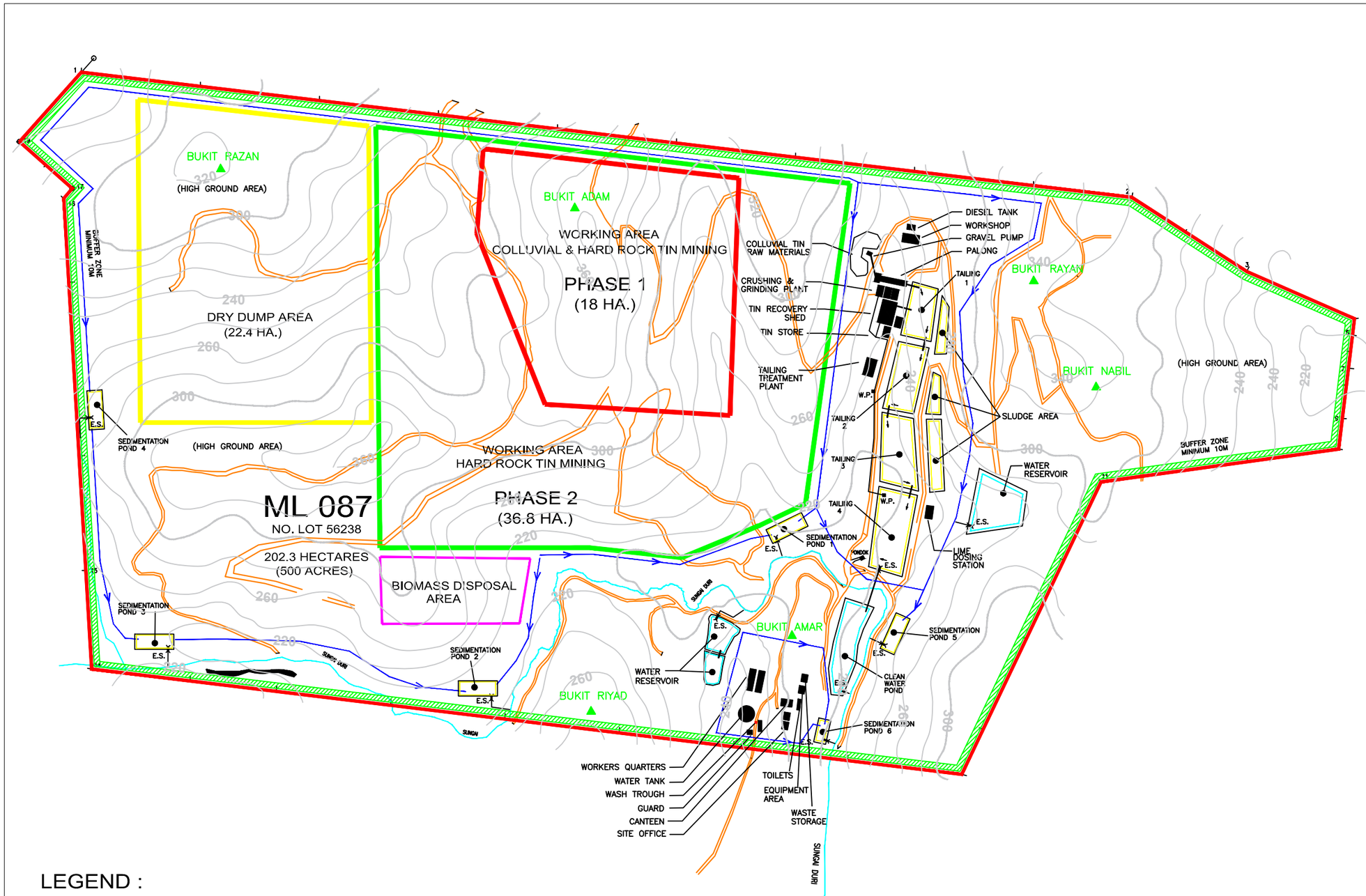
Proposed Compliance Monitoring

Environmental Components	Parameters to be Monitored	Compliance / Standard	Monitoring Location	Frequency
Water Quality	Total Suspended Solids	Total Suspended Solids: 50 mg/l	Final discharge point of sediment basin	• Monthly • Per rain event of 12.5 mm and above

Proposed Impact Monitoring

Environmental Components	Compliance / Standard	Monitoring Location	Frequency
Air Quality	• Malaysia Ambient Air Quality Standard (Standard 2020)	• 3 sampling stations (refer to **Figure ES-8**)	• Quarterly
Noise Quality	• First Schedule in the Guidelines for Environmental Noise Limits and Control, Third Edition, 2021, Department of Environment Malaysia.	• 3 sampling stations (refer to **Figure ES-8**)	• Quarterly
Water Quality (River Water)	• Class IIA, National Water Quality Standards for Malaysia by Department of Environment (DOE)	• 19 sampling stations (refer to **Figure ES-9**)	• Quarterly
Riparian Zone Monitoring	• Not available	• Along the river within the proposed Project site	• Half Yearly

Figure ES-7: LDP2M2 Drawings for the Proposed Project



LEGEND :

- Proposed Mining Area Covering 202.3 Hectares (500 Acres)
- Mining Phase 1
- Mining Phase 2
- Tailing Pond/ Sediment Pond
- Dry Dump
- Haulage Road
- Buffer Zone Minimum 10m
- Major Topograhic Contour (100m interval)
- Minor Topograhic Contour (20m interval)
- Sedimentation Pond
- E.S. — Emergency Spillway & Sedimentation Pond Discharge
- Parameter Drain with Check Dam
- Water Reservoir/ Clean Water
- River/ Stream
- W.P. — Water Pump

N (KIBLAT 292.50)

100 0 100 200m

PROJECT PROPONENT:

RBA ENGINEERING SDN BHD

TAJUK PROJEK :

PROPOSED TIN MINING OPERATION AT MUKIM PENGKALAN HULU (ML 087), DISTRICT OF HULU PERAK, PERAK

TAJUK LUKISAN :

LAND DISTURBING POLLUTION PREVENTION & MITIGATING MEASURES (LD-P2M2) PLAN

OVERALL LD-P2M2 PLAN

CPESC SIGNATURE:

I hereby certify that these works have been designed by me in accordance with sound engineering practice and that I take full responsibility for the design and proper performance of the same

CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL
CPESC
Hung Yee Hon
No. 8310

DATE	JUN 2023
SCALE	AS SHOWN
REVISION	0

DWG NO. RBD/LDP2M2/Rev0

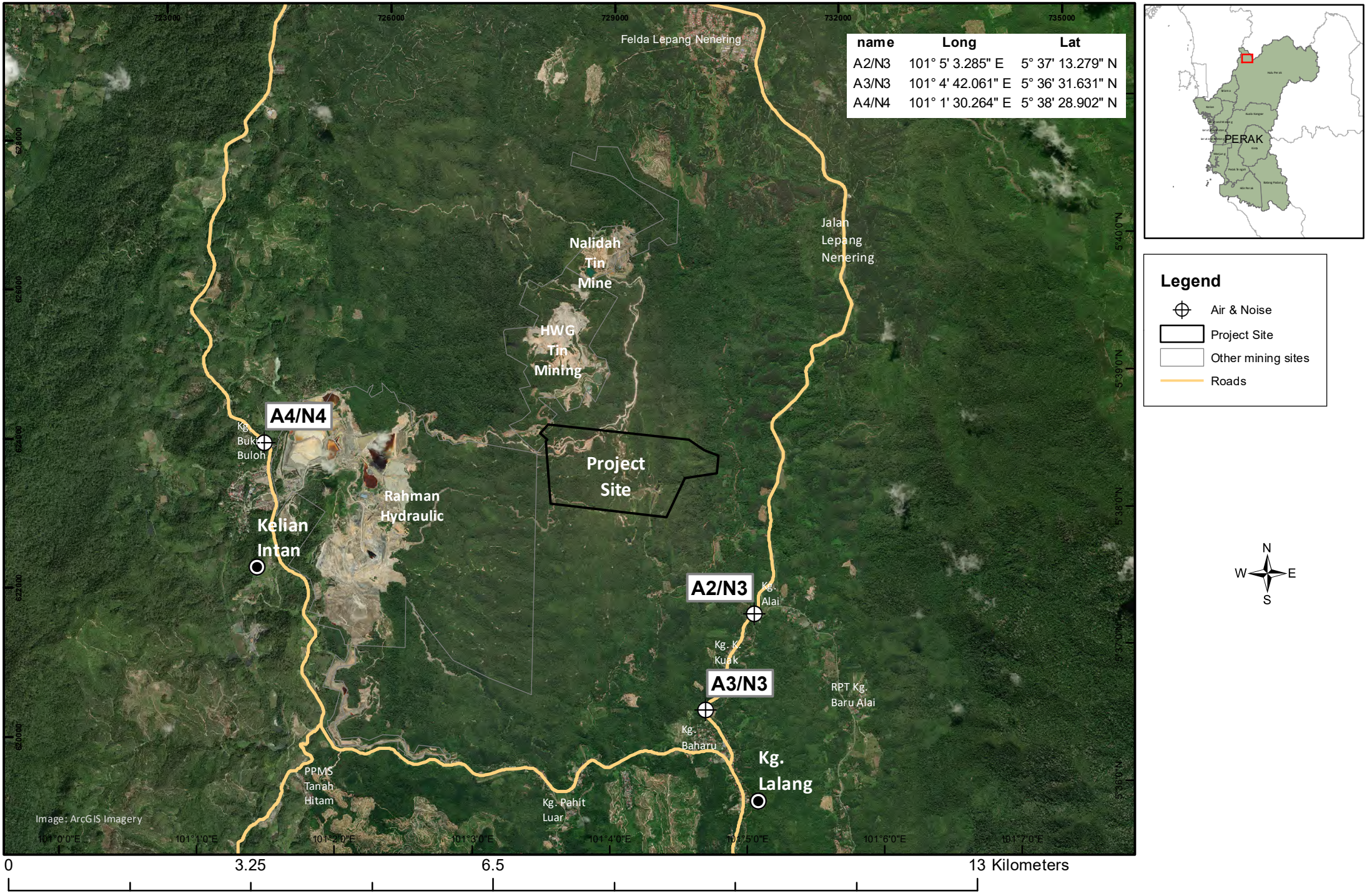


Figure ES-8: Proposed Monitoring Stations for Ambient Air and Noise Level

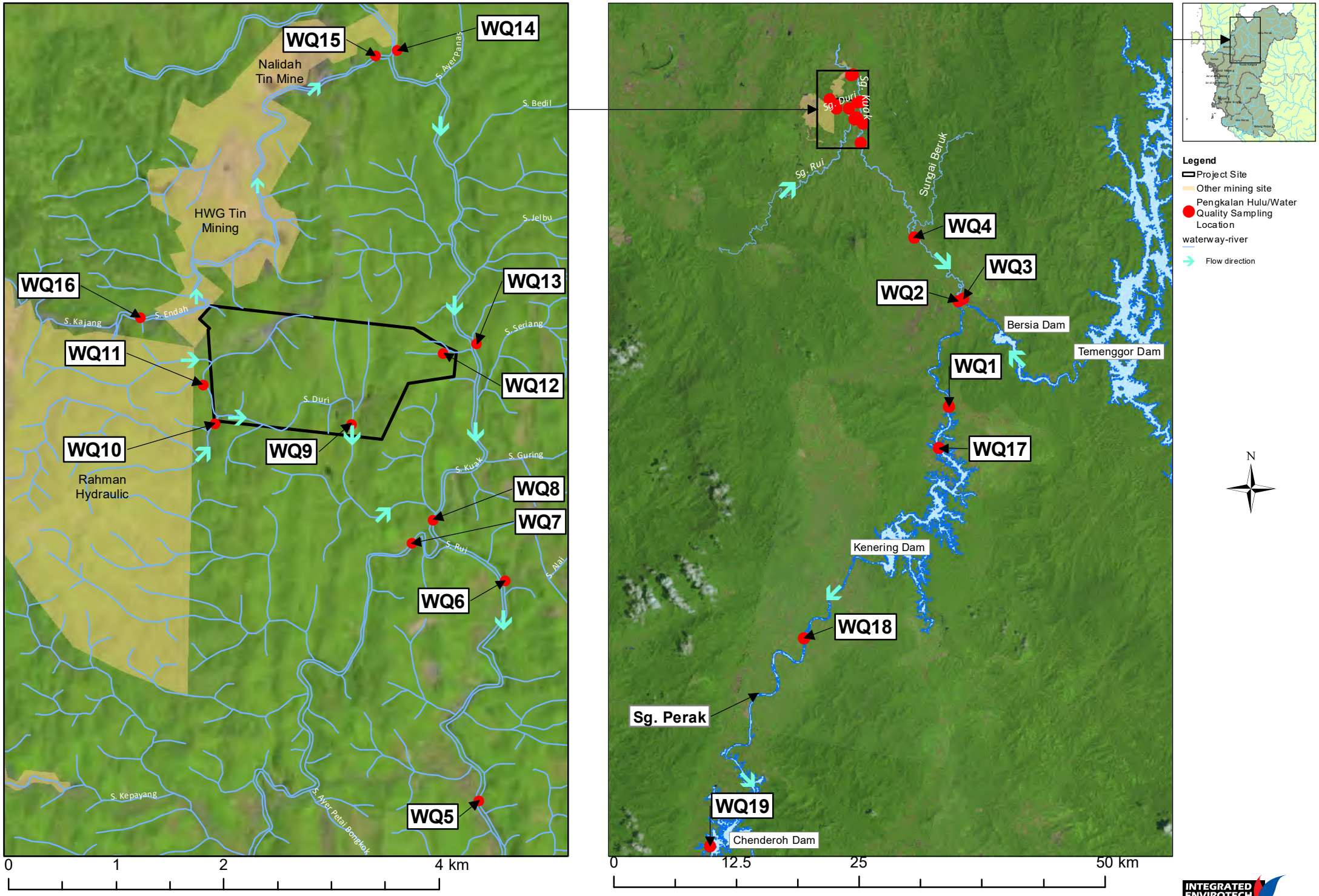


Figure ES-9: Proposed Monitoring Stations for River Water